Regression Analysis: Various Extensions

TOTAL POINTS 11

1. Data for Questions 1 through 5 are contained in the file realestate.xlsx. Please download this file. `1 point`

> realestate.xlsx

The data contains information about apartment prices and characteristics for a sought after area in a large metropolitan city in the USA. The data include sale price (PRICE) in $, floor area (SQFT) in square feet, number of bedrooms (BED), number of bathrooms (BATH), number of floors in the building (FLOORS), and distance from a centrally located city park (DIST) in meters.

You need to establish a relationship between PRICE and these other characteristics. Specifically, estimate the following regression model,

$LN(PRICE) = \beta_0 + \beta_1 LN(SQFT) + \beta_2 BED + \beta_3 BATH + \beta_4 FLOORS + \beta_5 DIST$

Notice that in the regression you need to take a log transformation of PRICE and SQFT variables. Report the estimated value of β_4, round the answer to four decimal digits.

> -0.0098

2. How do you interpret the coefficient estimate of β_1? `1 point`

- (●) When the size of the apartment increases by 1%, then the Price increases by 1.013%, all other variables remaining at the same level.

- (○) When the Price increases by a 100,000$, the size of apartment increases by 1.013*100 = 101.3 sqft.

- (○) When the size of the apartment increases by 1 unit, then the Price increases by 1.013 units, all other variables remaining at the same level.

- (○) When the size of the apartment increases by 1 unit, then the Price increases by 1.013 %, all other variables remaining at the same level.

3. What is the impact of an additional Bathroom on apartment price? `1 point`

- (○) All other variables being held constant, an additional Bathroom raises the apartment price by 0.0293%.

- (○) All other variables being held constant, an additional Bathroom raises the apartment price by 29,300$.

- (○) All other variables being held constant, an additional Bathroom raises the apartment price by 2.93%.

- (●) All other variables being held constant, an additional Bathroom does not significantly impact the price.

4. Using the estimated regression model, predict the price in dollars of an apartment that is 1000 sqft in size, has 2 Bedrooms, 2 Bathrooms, is in a building with 8 Floors and is 1.2 Km from the City Park. Round your answer to a whole number, input the answer without any "$" or "," sign. `1 point`

> 595368

5. Calculate a 95% confidence interval for your predicted price from Question 4. `1 point`

Report the lower limit of the confidence interval (in dollars), round your answer to a whole number. Input the answer without any "$" or "," sign.

> 368994

6. Data for Questions 6 through 11 is contained in the file Majors.xlsx. Please download this file. `1 point`

> Majors.xlsx

The data contains information about the starting salary of a sample of 50 undergraduate students at a Business school. The data consists of the starting salary (SALARY) in dollars, the field of study of the student (MAJOR), the field of study is either 'Finance' or 'International Business'. Finally, the variable UGPA is undergraduate Grade Point Average of the student.

Estimate a regression model linking starting salary to the field of study and UGPA as follows,

$SALARY = \beta_0 + \beta_1 IB + \beta_2 UGPA$

In the above regression, IB is a dummy variable which takes a value =1 when the MAJOR is IB, otherwise it takes a value 0.

Report the estimated value of β_1, round the answer to a whole number.

> -5145

7. Now, mean center the UGPA variable. That is, subtract the mean value of UGPA from all the data points. Denote this mean centered variable as [$UGPA$]. `1 point`

Run a regression as follows,

$SALARY = \beta_0 + \beta_1 IB + \beta_2 [UGPA]$

Round the estimated value of β_0 to a whole number and interpret it. Please mark all that apply.

- [✓] 60,630$ is the salary of a FINANCE Major with a UGPA equal to the average UGPA observed in the data.

- [ ] 60,630$ is the salary of a FINANCE Major with 0 UGPA

- [✓] 60,630$ is the value of the Y variable when all X variables are zero.

- [ ] 60,630$ is the salary of a IB Major with a UGPA equal to the average UGPA observed in the data.

8. Based on the regression carried out in Question 7, how much less salary (in dollars) does a IB Major get as compared to a FINANCE Major, when they have the same UGPAs. Round your answer to a whole number. Input the answer without any "$" or "," sign.

> 5145

9. There is a belief among students that higher UGPA is more important in terms of impacting starting salary for IB undergraduates as compared to FINANCE undergraduates.

You can empirically check for this belief by introducing an interaction variable in your regression model constructed in Question 7 and then checking the estimated coefficient for that variable.

To introduce the interaction variable which variables would you interact.

- [ ] Intercept and IB
- [x] IB and [UGPA]
- [ ] Intercept and [UGPA]

10. Introduce an interaction effect in your data and estimate the model. Report the estimate of the coefficient on the interaction variable. Please round your answer to a whole number.

> 7089

11. How do you interpret the coefficient on the interaction effect ?

- [ ] The coefficient is the differential impact of UGPA on starting salary of FINANCE majors as compared to IB majors.
- [ ] The coefficient is the impact of UGPA on starting salary of FINANCE majors.
- [ ] The coefficient is the impact of UGPA on starting salary.
- [ ] The coefficient is the impact of UGPA on starting salary of IB majors.
- [x] The coefficient is the differential impact of UGPA on starting salary of IB majors as compared to FINANCE majors.

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